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shape, and which rests upon the mucous membrane at the base of the bulb. These cells, of which there are from two to four in each bulb, he calls "basal cells of the buds." They are furnished with an oval nucleus, and send out many delicate processes which divide dichotomously, and, by means of the network thus formed, are in connection both with each other and with the stroma of the mucous membrane. In transverse sections through the bulbs, the basal cells are seen to form a protoplasmic net, in which the author sees an analogous formation to the olfactory mucous membrane. In the stroma underlying the bulbs are dense fasciculi of very fine nerve-fibrils, which disappear in the protoplasmic net of the basal cells. Within the bulbs frequent examples of nuclear division are present. Karyokinetic figures were seen most frequently in the basal cells, and very rarely in the "pillar cells." Hermann, from this fact, ascribes to the "basal cells" the rôle of acting as compensating cells for the taste-bulbs. The granular masses of v. Vintschgau he looks upon as degenerate "pillar cells." Respecting the taste-cells, he adds but little to what is already known. The number of these cells, he thinks, has been underestimated, there being, according to his statement, from ten to fifteen nerve-cells in a bulb. Passing from the gustatory pore inwards, he recognizes a second circular opening (within which may be seen the peripheral terminations of the "pillar cells"), for which he suggests the name "inner gustatory pore."   F. T.

Untersuchungen über die Papillae Foliatae et Circumvallatae des Kaninchen und Feldhasen. O. DRASCH. Abhandl. d. K. S. Gesellsch. d. Wiss., Bd. XXIV, S. 231-252. Mit 8 Tafeln.

In a former memoir (*Sitzb. d. k. Akad. d. Wiss. Wien,* Bd. 88, Abth. III, 1883) Drasch published the results of an investigation of the intimate structure of the foliate papilla of the rabbit and hare. The present paper deals in general with the same subject, and is designed to supplement his earlier treatise on the taste organs in mammals. In the first paper Drasch made the statement, which he has since been able to confirm, that the sensory cells present in the bulbs could not be a criterion for the sum of the taste-fibres of the glosso-pharyngeus nerve. In other words, the number of nerve-fibres into which the glosso-pharyngeus divides, directly below the bulb region of the various taste organs, far exceeds the sum of all the sensory cells in those organs. Beneath the basal membrane of the secondary leaf of the papilla foliata is a plexus formed of medullated nerve-fibres. From this plexus, fibres, corresponding in number to the sum of the sensory cells, go directly to the bulbs. Other fibres, more numerous, pass between the bulbs to the epithelium situated above them. Many fibres, however, terminate in the membranous stroma. Below the bulb region, in the entire width of the leaf, is found a connected stratum of ganglion cells which contribute to the multiplication of the fibres. In addition to the foregoing investigation, Drasch noted the changes produced in a papilla when subjected to various kinds of stimuli. If a normal papilla be pressed upon by a glass rod or stroked with a brush, no secretion of the glands follows ; but if a needle or bristle be introduced into a furrow and moved about, secretion takes place. Weak induction shocks applied to the surface of a

healthy papilla, or stimulation of the peripheral end of the divided glosso-pharyngeus, cause profuse secretion. Eight days after division of the nerve, the exterior of the papilla does not exhibit any important change visible to the naked eye, but stimulation of the peripheral trunk no longer produces secretion. If, however, the surface of the papilla be exposed to strong induction shocks, the glands continue to secrete for a while longer. By the fifth or sixth week no farther secretion takes place. In the case of a rabbit, investigated six months after division of the glosso-pharyngeus, the divided nerve had united, and the papilla experimented upon appeared to execute its functions quite normally. These experiments, Drasch says, "prove that in general, all gustable substances, when brought upon the taste papillae, or near them, induce secretion of the lingual glands, discharging into the furrows and trenches of the papillae. This secretion is due to reflex action, . . . and is brought about chiefly by means of the intra-epithelial plexus of nerves situated above the bulbs." "The glandular secretion serves for the washing away of dissolved gustable substances, and for continuous cleansing of the papillae. The time that elapses between touching the papilla with a gustable substance, and the subsequent secretion, must be such as to allow the substance in solution to penetrate as far as the bulbs. Yet the hypothesis, that over the entire papilla there are scattered fibres (having a free ending) which are capable of tasting is not inadmissible."　　F. T.

On the Auditory Labyrinth of Orthagoriscus Mola L. D'ARCY W. THOMPSON. Anat. Anzeiger, Jahrg. III, 1888, S. 93-96.

Professor Thompson found the auditory labyrinth of Orthagoriscus to differ in some respects from that of all Teleostean fishes. It hangs suspended by webs of delicate connective tissue within a wide space, continuous with the brain-cavity, as in Chimaera. A single vertical pillar of cartilage passes down across this space, within the arc of the horizontal canal. In the membranous labyrinth the following parts are distinguishable : latriculus with sinus superior, recessus utriculi, the three semicircular canals with their ampullae, and the sacculus and lagena. Six nerve-endings are visible, three cristae ampullarum, macula recessus utriculi, maculae sacculi and lagenae. The macula neglecta was wanting, and no trace of the ductus endolymphaticus was seen. No true otoliths are present, but instead the maculae are supplied with many small white otoconia, aggregated together. A few of these have a cubical crystalloidal form, similar to those of Acanthias, but most of them are round or oval, rough on the surface, and concentrically striated within. The proportions of the labyrinth are unusual, the semicircular canals being disproportionately long and the vestibule very small. Orthagoriscus differs from all other fishes except Lophobranchii in the complete conjunction of utriculus and sacculus, that is, in the absence of any distinction of pars superior and inferior.　　F. T.

On the Fate of the Muscle-plate, and the Development of the Spinal Nerves and Limb Plexuses in Birds and Mammals. A. M. PATERSON. Quart. Journ. Micr. Sci., Vol. XXVIII, 1887, pp. 109-129, pls. VII and VIII.

The author concludes from an examination of many sections that the spinal nerves are developed from epiblast throughout their entire